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(54) **A stair lift comprising a chair fitted with an adjustable seat**

Treppenaufzug mit einem Stuhl, der mit einem verstellbaren Sitz ausgestattet ist

Ascenseur d'escalier comprenant une chaise pourvue d' un siège réglable

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**US-A- 4 913 264**

- **PATENT ABSTRACTS OF JAPAN vol. 010, no. 385 (M-548), 24 December 1986 (1986-12-24) -& JP 61 175133 A (TACHIKAWA SPRING CO LTD), 6 August 1986 (1986-08-06)**
- **PATENT ABSTRACTS OF JAPAN vol. 199, no. 510, 30 November 1995 (1995-11-30) -& JP 07 186793 A (NHK SPRING), 25 July 1995 (1995-07-25)**

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## Description

[0001] The invention relates to a stair lift comprising a rail and a frame which is movable along said rail, on which frame a chair is mounted, which chair is fitted with a movable seat and a back.

[0002] A stair lift of this kind is described in US-A-4913264, and can be used for conveying a disabled person, who is unable to use the stairs or who is only able to do so with difficulty, along said stairs in seated position on said chair.

[0003] Since a lift of this kind is generally installed along an existing staircase, the space which is available for the stair lift is limited. Especially when the stair lift is not being used, the chair in particular should take up little space. In order to accomplish that, the chair can be fitted with supports, a seat and/or a footrest which can be swung aside. The seat of the chair can for example be pivoted upwards near its rear edge. It is also possible to construct the seat in two parts, whereby the front part can be pivoted upwards, as described in US-A-4913264.

[0004] The terms "front" or "front side" of the chair are understood to mean the side of the chair remote from the rail which faces in the direction in which the person seated on said chair faces, and the terms "rear" or "rear side" are understood to mean the side of the chair to which a person seated on said chair is turned with his back.

[0005] The object of the invention is to provide a stair lift which can be used while taking as little space as necessary with a minimum of effort.

[0006] A further object of the invention is to provide a stair lift fitted with a chair wherein it is possible in a simple manner to move the seat to a position in which it projects less far to the front, by means of a movement which is easy to execute, and which movable seat can be manufactured at low cost.

[0007] In order to accomplish that objective, the seat is movable between a front position and a rear position relative to said back, in which positions the seat lies substantially in the same horizontal plane. Thereby it is possible to use the chair not only with the seat in its "operative" front position, but also to use the chair with the seat positioned further to the rear, for example in connection with the dimensions or the condition of the person to be conveyed. Thus the effort for the disabled person to move the seat each time the lift is used is limited to a minimum.

[0008] In addition to that the upper side of the seat faces up in both positions of the seat, so that only that side of the seat needs to have an aesthetic appearance.

[0009] The number of positions which the seat can take up need not be limited to two positions. It is also possible to construct the chair such that the seat can be placed in several positions between the front and the rear position.

[0010] Preferably, the seat is movable between said

two positions by moving the seat at least partially in upward direction. The seat may thereby be mounted in such a manner that it will tilt temporarily during said movement, whereby preferably the front edge of the seat is lifted. This is an operation which is easy to carry out, also for a person who moves with difficulty, because it is a small movement to be carried out at the part of the seat that extends furthest to the front.

[0011] Preferably, the seat is connected to the frame near its rear edge by means of a guide which enables a substantially horizontal movement of the rear edge, and near its front edge the seat is connected to the frame via a pivoting arm, which pivoting arm enables the front edge to move along a circular arc. The circular arc thereby lies in a vertical plane in the direction of movement of the seat. The pivot axis of the pivoting arm, or of two pivoting arms, one near each side edge of the seat, may be positioned near the underside of the seat, and preferably it is positioned lower, preferably more than 10 mm below the underside of the seat.

[0012] The above construction makes it possible in an easy manner to create a front and a rear position of the seat, wherein the seat is locked against movement in both positions when a person is seated on the chair.

[0013] Preferably, the seat can be locked in both positions, or, if more positions are possible, in all positions, preferably by the downward force which is exerted by a person who is seated on the seat, as described above. A construction of this kind is safe because a separate operation is not required for locking the seat in position.

[0014] The invention can preferably be used with a stair lift comprising a chair which is fitted with two armrests, which armrests can be moved from the operative position to a position further to the rear. The armrests can slide to the rear thereby or pivot about a horizontal axis. The chair may furthermore be fitted with a footrest which can be moved between an operative, substantially horizontal position and a substantially vertical position. All projecting parts of the chair of the stair lift can thus be moved to a position in which they are not in the way as much.

[0015] In one preferred embodiment the seat extends to below the back in the rear position, so that the seat is moved maximally rearwards. The rear side of the seat thereby extends approximately as far as the rear side of the back, or further to the rear.

[0016] Preferably, the movable seat is provided near its front edge with a downwardly extending protective plate, so that a person cannot easily reach below the seat with his hand, especially while the seat is being moved. Preferably, a handle is furthermore present near the front edge of the seat. Said handle makes it easier to move the seat, and in addition the presence of the handle shows that the seat can be moved.

[0017] The invention furthermore relates to a chair for a stair lift, which chair can be fixedly mounted on a frame which is movable along a rail, which chair is fitted with a movable seat and a back, wherein the seat is movable

between a front position and a rear position relative to said back, in which positions the seat lies substantially in the same horizontal plane.

[0018] Finally the invention relates to a method for conveying a person by means of a stair lift comprising a rail and a frame which is moved along said rail, on which frame a chair is mounted, which chair is fitted with a movable seat and a back, wherein the seat is moved from a rear position to a front position relative to said back, in which positions the seat lies substantially in the same horizontal plane, before the person seats himself on the chair.

[0019] In order to explain the invention more fully, an embodiment of a chair for a stair lift will be described hereafter with reference to the drawing.

[0020] Figures 1, 2 and 3 are schematic side views of a part of a chair of a stair lift, leaving out the front armrest (seen in the direction of the view).

[0021] The chair is mounted on a frame 1, which is provided with means (not shown) for engaging the rail system of the stair lift. The chair is furthermore fitted with a seat 2, a back 3 and an armrest 4. The back 3 is connected to frame 1 by means of a bracket 5, and armrest 4 is connected to frame 1 by means of bracket 6.

[0022] The seat 2 is secured to a metal plate 7, which plate comprises a downwardly extending part at the front side, which forms a protective plate 13, which prevents a person from reaching under the seat with his hand without much difficulty. Furthermore a handle 12 is present under the front edge of the seat, which functions to facilitate movement of the seat.

[0023] The metal plate 7 is provided with a support 8 near the front edge of the seat (on the left in the figures), to which support pivoting arm 9 is pivotally connected. Pivoting arm 9 is connected to frame 1 with its other end.

[0024] The metal plate 7 is provided with a guide 10 near the rear end of the seat, in which a pin 11 fixed to frame 1 is positioned.

[0025] A pivoting arm 9 as well as a guide 10 are present on either side of the seat 2.

[0026] The movement of the seat 2 of the chair is illustrated in the various figures. Figure 1 shows the seat 2 in its rear position. In order to move the seat 2 to the front, the front edge of the seat 2 must be lifted by hand to a position which is shown in Figure 2. The pivoting arm 9 pivots forward thereby and the guide 10 moves with respect to pin 11.

[0027] Subsequently, the seat can readily be moved to the front position which is shown in Figure 3. Pivoting arm 9 has pivoted to the front thereby. It will be apparent that the seat will be locked against movement when a person is present thereon, which is desirable for safety reasons.

[0028] The illustrated embodiment is merely an example, which is shown to explain the invention. Also other constructions for moving the seat can be devised without difficulty within the scope of the appended claims.

## Claims

1. A stair lift comprising a rail and a frame (1) which is movable along said rail, on which frame (1) a chair is mounted, which chair is fitted with a movable seat (2) and a back (3), **characterized in that** the seat (2) is movable between a front position and a rear position relative to said back (3), in which positions the seat (2) lies substantially in the same horizontal plane.
2. A stair lift according to claim 1, **characterized in that** the seat (2) is movable between said two positions by moving the seat (2) at least partially in upward direction.
3. A stair lift according to claim 2, **characterized in that** the seat (2) can be moved by lifting the front edge.
4. A stair lift according to claim 3, **characterized in that** the seat (2) is connected to the frame (1) near its rear edge by means of a guide (10) which enables a substantially horizontal movement of the rear edge, and near its front edge the seat (2) is connected to the frame (1) via a pivoting arm (9), which pivoting arm (9) enables the front edge to move along a circular arc.
5. A stair lift according to any one of the preceding claims, **characterized in that** the seat (2) can be locked in both positions.
6. A stair lift according to any one of the preceding claims, wherein two armrests (4) are present, **characterized in that** the two armrests (4) can be moved from the operative position to a position further to the rear.
7. A stair lift according to any one of the preceding claims, **characterized in that** a footrest is provided, which footrest can be moved between an operative, substantially horizontal position and a substantially vertical position.
8. A stair lift according to any one of the preceding claims, **characterized in that** the seat (2) extends to below the back (3) in the rear position.
9. A stair lift according to any one of the preceding claims, **characterized in that** the movable seat (2) is provided near its front edge with a downwardly extending protective plate (13).
10. A stair lift according to any one of the preceding claims, **characterized in that** a handle (12) is provided near the front edge of the seat (2).

11. A chair for a stair lift, which chair can be fixedly mounted on a frame which is movable along a rail, which chair is fitted with a movable seat (2) and a back (3), **characterized in that** the seat (2) is movable between a front position and a rear position relative to said back (3), in which positions the seat (2) lies substantially in the same horizontal plane.
12. A method for conveying a person by means of a stair lift comprising a rail and a frame (1) which is moved along said rail, on which frame (1) a chair is mounted, which chair is fitted with a movable seat (2) and a back (3), **characterized in that** the seat (2) is moved from a rear position to a front position relative to said back (3), in which positions the seat (2) lies substantially in the same horizontal plane, before the person seats (2) himself on the chair.

#### Patentansprüche

1. Treppenaufzug, umfassend eine Schiene und einen Rahmen (1), der entlang der Schiene bewegbar ist, wobei auf dem Rahmen (1) ein Sitzplatz angeordnet ist, und der Sitzplatz eine bewegbare Sitzfläche (2) und eine Rückenlehne (3) aufweist, **dadurch gekennzeichnet, dass** die Sitzfläche (2) zwischen einer vorderen Stellung und einer hinteren Stellung, bezogen auf die Rückenlehne (3), bewegbar ist und die Sitzfläche (2) in diesen Stellungen im wesentlichen in derselben horizontalen Ebene liegt.
2. Treppenaufzug nach Anspruch 1, **dadurch gekennzeichnet, dass** die Sitzfläche (2) zwischen den beiden Stellungen durch eine Bewegung der Sitzfläche (2) bewegbar ist, die mindestens teilweise nach oben gerichtet ist.
3. Treppenaufzug nach Anspruch 2, **dadurch gekennzeichnet, dass** die Sitzfläche (2) durch Anheben der vorderen Kante bewegbar ist.
4. Treppenaufzug nach Anspruch 3, **dadurch gekennzeichnet, dass** die Sitzfläche (2) mit dem Rahmen (1) nahe ihrer hinteren Kante mittels einer Führung (10) verbunden ist, die eine im wesentlichen horizontale Bewegung der hinteren Kante ermöglicht, und die Sitzfläche (2) nahe ihrer vorderen Kante mit dem Rahmen (1) über einen Schwenkarm (9) verbunden ist, wobei der Schwenkarm (9) ermöglicht, daß die vordere Kante sich entlang eines Kreisbogens bewegt.
5. Treppenaufzug nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Sitzfläche (2) in beiden Stellungen verriegelbar ist.

6. Treppenaufzug nach einem der vorangehenden Ansprüche, bei dem zwei Armlehnen (4) vorgesehen sind, **dadurch gekennzeichnet, dass** die zwei Armlehnen (4) von der Gebrauchsstellung in eine Stellung bewegbar sind, die weiter hinten liegt.
7. Treppenaufzug nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** eine Fußstütze vorgesehen ist, wobei die Fußstütze zwischen einer im wesentlichen horizontalen Gebrauchsstellung und einer im wesentlichen vertikalen Stellung bewegbar ist.
8. Treppenaufzug nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Sitzfläche (2) sich bis unterhalb der Rückenlehne (3) in der hinteren Stellung erstreckt.
9. Treppenaufzug nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die bewegbare Sitzfläche (2) nahe ihrer vorderen Kante mit einer nach unten verlaufenden Schutzplatte (13) versehen ist.
10. Treppenaufzug nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** ein Handgriff (12) nahe der vorderen Kante der Sitzfläche (2) angeordnet ist.
11. Sitzplatz für einen Treppenaufzug, wobei der Sitzplatz fest auf einem Rahmen anbringbar ist, der entlang einer Schiene bewegbar ist, und der Sitzplatz eine bewegbare Sitzfläche (2) und eine Rückenlehne (3) aufweist, **dadurch gekennzeichnet, dass** die Sitzfläche (2) zwischen einer vorderen Position und einer hinteren Position, bezogen auf die Rückenlehne (3), bewegbar ist und die Sitzfläche (2) in diesen Stellungen im wesentlichen in derselben horizontalen Ebene liegt.
12. Verfahren zum Befördern einer Person mittels eines Treppenaufzuges mit einer Schiene und einem Rahmen (1), der entlang der Schiene bewegt wird, wobei auf dem Rahmen (1) ein Sitzplatz angeordnet ist, der Sitzplatz eine bewegbare Sitzfläche (2) und eine Rückenlehne (3) aufweist, **dadurch gekennzeichnet, dass** die Sitzfläche (2) von einer hinteren Stellung in eine vordere Stellung, bezogen auf die Rückenlehne (3), bewegt wird und die Sitzfläche (2) in diesen Stellungen im wesentlichen in derselben horizontalen Ebene liegt, bevor die Person sich auf die Sitzfläche (2) des Sitzplatzes setzt.

#### Revendications

1. Élévateur pour escalier, comprenant un rail et un châssis (1) qui est mobile le long du rail, un siège

- étant monté sur ce châssis (1), le siège étant muni d'une assise mobile (2) et d'un dossier (3), **caractérisé en ce que** l'assise (2) est mobile entre une position avant et une position arrière par rapport au dossier (3), le siège (2) se trouvant pratiquement dans le même plan horizontal dans ces positions.
2. Elévateur pour escalier selon la revendication 1, **caractérisé en ce que** l'assise (2) est mobile entre les deux positions par déplacement de l'assise (2) au moins partiellement vers le haut.
  3. Elévateur pour escalier selon la revendication 2, **caractérisé en ce que** l'assise (2) peut être déplacée par soulèvement du bord avant.
  4. Elévateur pour escalier selon la revendication 3, **caractérisé en ce que** l'assise (2) est raccordée au châssis (1) près de son bord arrière par un guide (10) qui permet un déplacement pratiquement horizontal du bord arrière et, près de son bord avant, l'assise (2) est raccordée au châssis (1) par un bras pivotant (9), ce bras pivotant (9) permettant au bord avant de se déplacer suivant un arc de cercle.
  5. Elévateur pour escalier selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'assise peut être bloquée dans les deux positions.
  6. Elévateur pour escalier selon l'une quelconque des revendications précédentes, dans lequel deux accoudoirs (4) sont présents, **caractérisé en ce que** les deux accoudoirs (4) peuvent être déplacés de la position de fonctionnement à une position plus éloignée vers l'arrière.
  7. Elévateur pour escalier selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'un** marchepied est incorporé, et ce marchepied peut être déplacé entre une position pratiquement horizontale de fonctionnement et une position pratiquement verticale.
  8. Elévateur pour escalier selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'assise (2) s'étend au-dessous du dossier (3) en position arrière.
  9. Elévateur pour escalier selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'assise mobile (2) est munie près de son bord avant d'une plaque protectrice (13) qui s'étend vers le bas.
  10. Elévateur pour escalier selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'une** poignée (12) est placée près du bord avant de l'assise (2).
  11. Siège d'élévateur pour escalier, ce siège pouvant être monté de manière fixe sur un châssis qui est mobile le long d'un rail, le siège étant muni d'une assise mobile (2) et d'un dossier (3), **caractérisé en ce que** l'assise (2) est mobile entre une position avant et une position arrière par rapport au dossier (3), l'assise (2) étant pratiquement dans un même plan horizontal dans ces positions.
  12. Procédé de transport d'une personne à l'aide d'un élévateur pour escalier comprenant un rail et un châssis (1) qui est déplacé le long du rail, un siège étant monté sur ce châssis (1), le siège étant muni d'une assise mobile (2) et d'un dossier (3), **caractérisé en ce que** le siège (2) est déplacé d'une position arrière vers une position avant par rapport au dossier (3), le siège (2) se trouvant pratiquement dans un même plan horizontal dans ces positions, avant que la personne ne s'assoie elle-même (2) sur le siège.

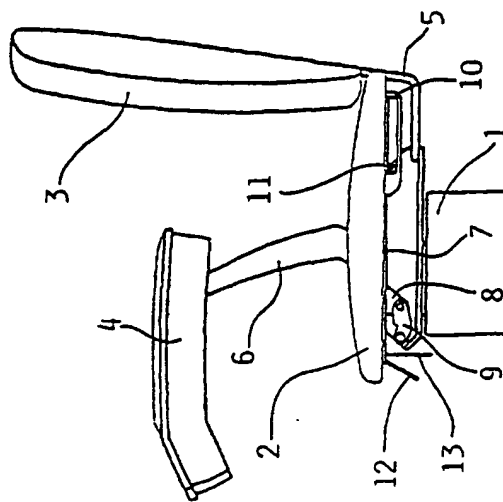


FIG. 1

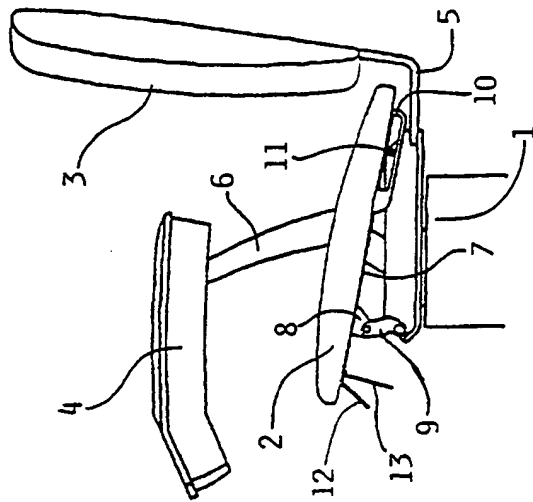


FIG. 2

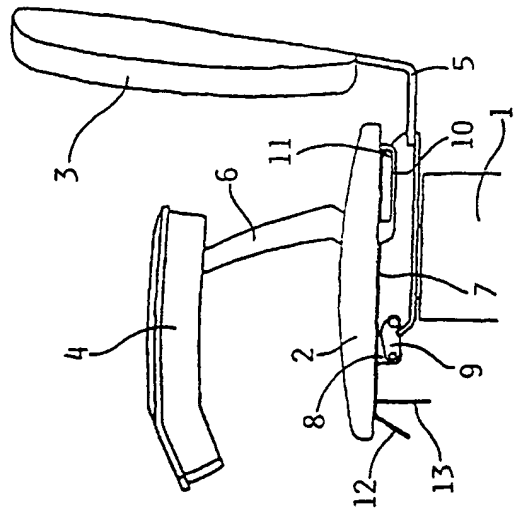


FIG. 3